

QUALITY ASSURANCE PROJECT PLAN
Peninsula Boulevard Site
Hewlett, New York

Revision 5

Prepared for:
United States Environmental Protection Agency/Environmental Response Team
Edison, New Jersey

By:
Lockheed Martin/Scientific, Engineering, Response and Analytical Services
Work Assignment Number: SERAS-149

Based on the Intergovernmental Data Quality Task Force Uniform
Federal Policy for Quality Assurance Project Plans
(Final Version 1.1, June 2006)

April 23, 2015

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QAPP Worksheet #1
Title and Approval Page

Site Name/Project Name: Peninsula Boulevard Site
Site Location: Hewlett, New York (NY)

Document Title: Revised Quality Assurance Project Plan (QAPP) for Peninsula Boulevard Site – April 2015 Mobilization

Lead Organization: Environmental Protection Agency/Environmental Response Team (EPA/ERT)

Preparer's Name and Organizational Affiliation: Jean Bolduc, Lockheed Martin / Scientific, Engineering, Response and Analytical Services (SERAS)

Preparer's Address, Telephone Number, and E-mail Address: 2890 Woodbridge Avenue, Edison, New Jersey 08837, (732) 321-4280, jean.m.bolduc@lmco.com

Preparation Date (Month/Day/Year): April 23, 2015

Investigative Organization's Project Manager/ Date: _____

Signature

Printed Name/Organization: Jeff Catanzarita/ERT Work Assignment Manager

Investigative Organization's Project QA Officer/Date: _____

Signature

Printed Name/Organization: Stephen Blaze, ERT Quality Coordinator

Lead Organization's Project Manager/Date: _____

Signature

Printed Name/Organization: Jean Bolduc/SERAS Task Leader

Approval Signatures/Date: _____

Signature

Printed Name/Title: Deborah Killeen/SERAS QA/QC Officer

Approval Authority: SERAS

Other Approval Signatures/Date: _____

Signature

Printed Name/Title: Kevin Taylor/SERAS Program Manager

Document Control Numbering System: SERAS-149-DQAPPR5-042315

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QAPP Worksheet #2 QAPP Identifying Information

Site Name/Project Name: Peninsula Boulevard Site

Site Location: Hewlett, NY

Site Number/Code: 02TV

Operable Unit: OU-2

Contractor Name: Lockheed Martin

Contractor Number: EP-W-09-031

Contract Title: SERAS

Work Assignment Number: SERAS-149

1. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

2. Identify approval entity: US EPA/ERT

3. The QAPP is (select one): ☐ Generic ☒ Project Specific

4. List dates of scoping sessions that were held: 04/01/15

5. List dates and titles of QAPP documents written for previous site work, if applicable:

Title	Approval Date
QAPP for Peninsula Boulevard Groundwater Plume Site, Response Engineering and Analytical Contract (REAC) document #0309-DQAPP-051308	5/13/08
QAPP for Peninsula Boulevard, Hewlett, New York, SERAS document SERAS-149-DQAPP-120511	12/06/11
QAPP for Peninsula Boulevard, Hewlett, New York, SERAS document SERAS-149-DQAPPA1-060713	06/07/13
QAPP for Peninsula Boulevard, Hewlett, New York, SERAS document SERAS-149-DQAPPA2-031714	03/24/14
QAPP for Peninsula Boulevard, Hewlett, New York, SERAS document SERAS-149-DQAPPA3-092314	09/24/14
Revised QAPP for Peninsula Boulevard – January 2015 Mobilization, Hewlett, New York, SERAS document SERAS-149-DQAPPA4-012115	02/23/15

6. List organizational partners (stakeholders) and connection with lead organization:
EPA Region 2

7. List data users:
EPA Region 2

8. If any required QAPP elements and required information are not applicable to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusions below:

Worksheet #37 – EPA Region 2 is responsible for the usability of the data

QAPP Worksheet #2
QAPP Identifying Information
(Continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Project Management and Objectives		
2.1 Title and Approval Page	- Title and Approval Page	1
2.2 Document Format and Table of Contents	- Table of Contents	2
2.2.1 Document Control Format	- QAPP Identifying Information	
2.2.2 Document Control Numbering System		
2.2.3 Table of Contents		
2.2.4 QAPP Identifying Information		
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2.3.2 Project Personnel Sign-Off Sheet		
2.4 Project Organization	- Project Organizational Chart	5
2.4.1 Project Organizational Chart	- Communication Pathways	6
2.4.2 Communication Pathways	- Personnel Responsibilities and Qualifications Table	
2.4.3 Personnel Responsibilities and Qualifications	- Special Personnel Training Requirements Table	7
2.4.4 Special Training Requirements and Certification		8
2.5 Project Planning/Problem Definition	- Project Planning Session Documentation (including Data Needs tables)	
2.5.1 Project Planning (Scoping)	- Project Scoping Session Participants Sheet	
2.5.2 Problem Definition, Site History, and Background	- Problem Definition, Site History, and Background	9
	- Site Maps (historical and present)	
		10
2.6 Project Quality Objectives and Measurement Performance Criteria	- Site-Specific PQOs	11
2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process	- Measurement Performance Criteria Table	12
2.6.2 Measurement Performance Criteria		

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QAPP Identifying Information
(Continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
2.7 Existing Data Evaluation	<ul style="list-style-type: none"> - Sources of Existing Data and Information - Existing Data Criteria and Limitations Table 	13
2.8 Project Overview and Schedule	<ul style="list-style-type: none"> - Summary of Project Tasks 	14
2.8.1 Project Overview	<ul style="list-style-type: none"> - Reference Limits and Evaluation Table 	15
2.8.2 Project Schedule	<ul style="list-style-type: none"> - Project Schedule/Timeline Table 	16
Measurement/Data Acquisition		
3.1 Sampling Tasks	<ul style="list-style-type: none"> - Sampling Design and Rationale 	17
3.1.1 Sampling Process Design and Rationale	<ul style="list-style-type: none"> - Sample Location Map 	18
3.1.2 Sampling Procedures and Requirements	<ul style="list-style-type: none"> - Sampling Locations and Methods/SOP Requirements Table 	18
3.1.2.1 Sampling Collection Procedures	<ul style="list-style-type: none"> - Analytical Methods/SOP Requirements Table 	19
3.1.2.2 Sample Containers, Volume, and Preservation	<ul style="list-style-type: none"> - Field Quality Control Sample Summary Table 	20
3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures	<ul style="list-style-type: none"> - Sampling SOPs 	21
3.1.2.3 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures	<ul style="list-style-type: none"> - Project Sampling SOP References Table 	21
3.1.2.4 Supply Inspection and Acceptance Procedures	<ul style="list-style-type: none"> - Field Equipment Calibration, Maintenance, Testing, and Inspection Table 	22
3.1.2.6 Field Documentation Procedures		
3.2 Analytical Tasks	<ul style="list-style-type: none"> - Analytical SOPs 	23
3.2.1 Analytical SOPs	<ul style="list-style-type: none"> - Analytical SOP References Table 	23
3.2.2 Analytical Instrument Calibration Procedures	<ul style="list-style-type: none"> - Analytical Instrument Calibration Table 	24
3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures	<ul style="list-style-type: none"> - Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table 	25
3.2.4 Analytical Supply Inspection and Acceptance Procedures		

QAPP Worksheet #2
QAPP Identifying Information
(Continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Required Documents
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal	26 27
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples Table - Screening/Confirmatory Analysis Decision Tree	28
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records Table - Analytical Services Table - Data Management SOPs	29 30
Assessment/Oversight		
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments Table - Audit Checklists - Assessment Findings and Corrective Action Responses Table	31 32
4.2 QA Management Reports	- QA Management Reports Table	33
4.3 Final Project Report		

QAPP Worksheet #2
QAPP Identifying Information
(Continued)

Required QAPP Element(s) and Corresponding QAPP Section(s)	Required Information	Crosswalk to Related Documents
Data Review		
5.1 Overview		
5.2 Data Review Steps	- Verification (Step I) Process Table	34
5.2.1 Step I: Verification		
5.2.2 Step II: Validation	- Validation (Steps IIa and IIb) Process Table	35
5.2.2.1 Step IIa Validation Activities		
5.2.2.2 Step IIb Validation Activities	- Validation (Steps IIa and IIb) Summary Table	36
5.2.3 Step III: Usability Assessment		
5.2.3.1 Data Limitations and Actions from Usability Assessment	- Usability Assessment	NA
5.2.3.2 Activities		
5.3 Streamlining Data Review		
5.3.1 Data Review Steps To Be Streamlined		
5.3.2 Criteria for Streamlining Data Review		
5.3.3 Amounts and Types of Data Appropriate for Streamlining		

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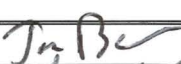
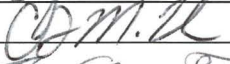
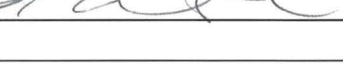
QAPP Worksheet #3
Distribution List

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Jeff Catanzarita	Work Assignment Manager (WAM)	ERT	(732) 906-6929	(732) 321-6724	catanzarita.jeff@epamail.epa.gov	SERAS-149-DQAPPR5-042315
Stephen Blaze	Quality Coordinator	ERT	(732) 906-6921	(732) 321-6724	blaze.stephen@epamail.epa.gov	SERAS-149-DQAPPR5-042315
Gloria Sosa	Remedial Project Manager (RPM)	EPA Region 2	(212) 637-4283	(212) 637-3966	sosa.gloria@epamail.epa.gov	SERAS-149-DQAPPR5-042315
Jean Bolduc	Hydrogeologist/Task Leader (TL)	SERAS	(732) 321-4280	(732) 494-4021	jean.m.bolduc@lmco.com	SERAS-149-DQAPPR5-042315
Deborah Killeen	Quality Assurance/ Quality Control (QA/QC) Officer	SERAS	(732) 321-4245	(732) 494-4021	deborah.a.killeen@lmco.com	SERAS-149-DQAPPR5-042315
Richard Leuser	Deputy Program Manager (DPM)	SERAS	(732) 494-4060	(732) 494-4021	richard.m.leuser@lmco.com	SERAS-149-DQAPPR5-042315
Kevin Taylor	Program Manager	SERAS	(732) 321-4202	(732) 494-4021	kevin.c.taylor@lmco.com	SERAS-149-DQAPPR5-042315

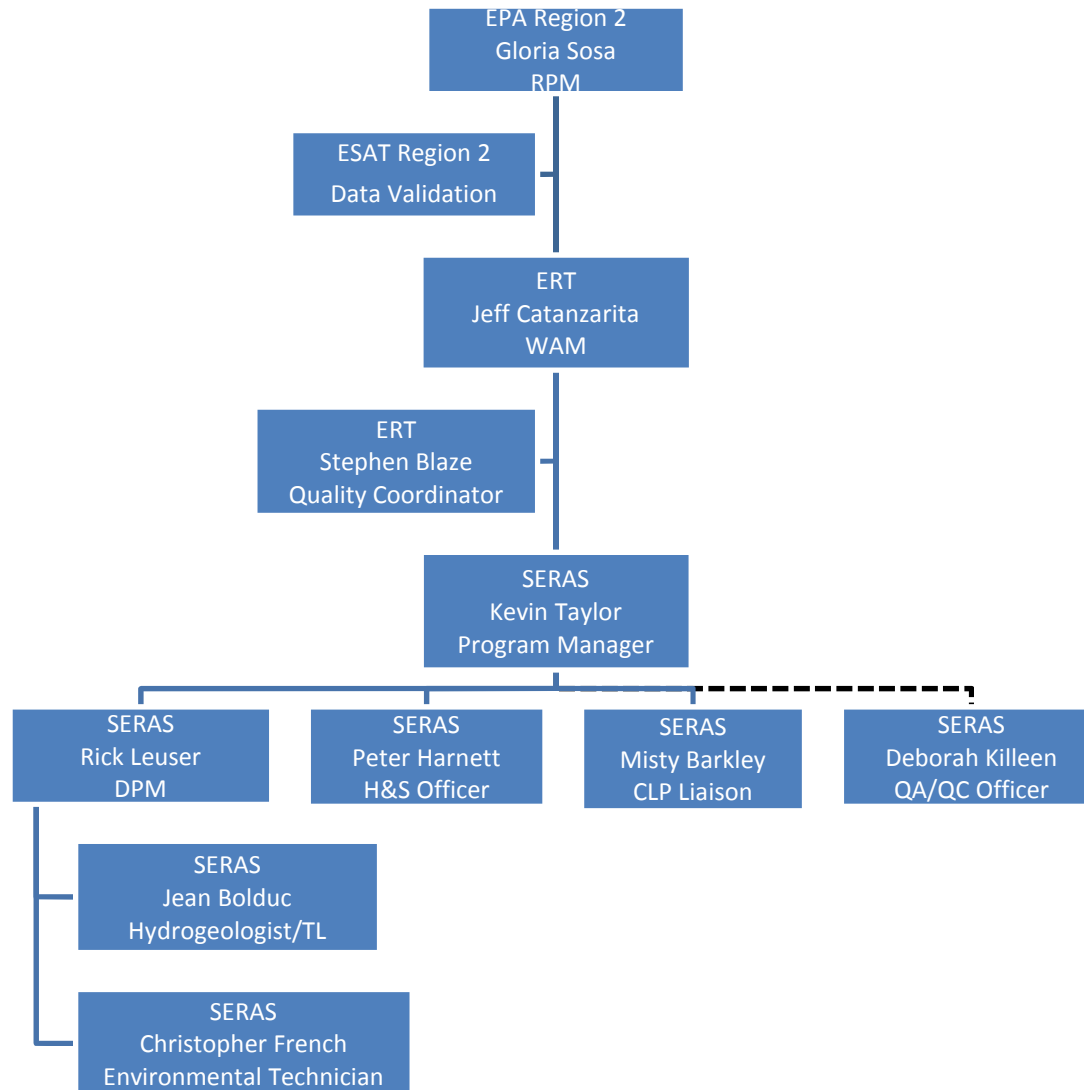
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QAPP Worksheet #4
Project Personnel Sign-Off Sheet

Organization: SERAS/EPA/ERT

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Jean Bolduc	SERAS Hydrogeologist/TL	(732) 321-4280		4/27/15
Christopher French	SERAS Environmental Technician	(732) 494-4040		4/27/15
Jeff Catanzarita	ERT WAM	(732) 906-6929		2/27/15
Gloria Sosa	EPA RPM	(212) 637-4283		

QAPP Worksheet #5
Project Organizational Chart



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QAPP Worksheet #6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Approval of initial QAPP and any amendments	ERT WAM ERT Quality Manager SERAS Program Manager SERAS QA/QC Officer SERAS TL	Jeff Catanzarita Stephen Blaze Kevin Taylor Deborah Killeen Jean Bolduc	(732) 906-6929 (732) 906-6921 (732) 321-4202 (732) 321-4245 (732) 321-4280	SERAS internal peer review, followed by ERT approval, implementation of changes effective only with approved QAPP or QAPP Change Form.
Nonconformance and Corrective Action	SERAS TL ERT WAM SERAS QA/QC Officer	Jean Bolduc Jeff Catanzarita Deborah Killeen	(732) 321-4280 (732) 906-6929 (732) 321-4245	Use of the Work Assignment Field Change Form for field issues.
Posting of Deliverables to the ERT Information Management System (IMS) website	SERAS TL SERAS QA/QC Officer SERAS Administrative Support SERAS Deputy Program Manager	Jean Bolduc Deborah Killeen Eileen Ciambotti Rick Leuser	(732) 321-4280 (732) 321-4245 (732) 321-4255 (732) 494-4060	As per work assignment, posting of deliverables to ERT-IMS website constitutes delivery to the WAM.
Work Assignment (WA)	SERAS Program Manager ERT WAM	Kevin Taylor Jeff Catanzarita	(732) 321-4202 (732) 906-6929	Describes scope of work to SERAS personnel from the ERT WAM.
Health and Safety On-Site Meeting	SERAS TL and/or Site Health and Safety Officer	Jean Bolduc	(732) 321-4280	Describe potential site hazards, required personal protective equipment, and access to local emergency services.

QAPP Worksheet #7
Personnel Responsibilities and Qualification Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Jean Bolduc	Hydrogeologist/TL	SERAS	Project Supervision/Subcontractor Oversight/Site Health and Safety Officer	Minimum BS degree plus 8 years related experience/LM Employee Files
Christopher French	Environmental Technician	SERAS	Field Activities/Sampling/Scribe	Environmental sampling experience/LM Employee Files
Deborah Killeen	QA/QC Officer	SERAS	QA/Deliverable Review	Minimum BS degree plus 14 years related experience/ LM Employee Files
Kevin Taylor	Program Manager	SERAS	Program Oversight	Minimum B.S. degree plus 14 years of related experience/LM Employee Files
Peter Harnett	Health and Safety Officer	SERAS	HASP Review, PPE Selection, H&S Oversight	Minimum B.S. degree plus 14 years of related experience/LM Employee Files
Jeff Catanzarita	WAM	EPA/ERT	Technical Direction; Contract Laboratory Program (CLP) Coordination	EPA job-specific qualifications/In EPA files
Gloria Sosa	RPM	EPA Region 2	Technical Oversight	EPA job-specific qualifications/In EPA files
Stephen Blaze	Quality Manager	EPA/ERT	QA Oversight	EPA job-specific qualifications/In EPA files

HASP = health and safety plan
 PPE = personal protective equipment
 H&S = health and safety

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QAPP Worksheet #8
Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Project/Subcontractor Oversight	40 Hours + 8 Hr Annual Refresher Health & Safety Training	SERAS	Sept. 2015*	Jean Bolduc	TL/ Hydrogeologist/ SERAS	SERAS H&S Files
Field Activities	40 Hours + 8 Hr Annual Refresher Health & Safety Training	SERAS	Nov. 2015*	Christopher French	Environmental Technician/ SERAS	SERAS H&S Files
QA Oversight	Uniform Federal Policy for Quality Assurance Project Plans	Advanced Systems	January 2006	Deborah Killeen	QA/QC Officer/SERAS	Quality Files

* Date training expires.

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QAPP Worksheet #9 Project Scoping Session Participants Sheet

Project Name: Peninsula Boulevard Site (WA# SERAS-149.4) Projected Date(s) of Sampling: Beginning 04/27/15 Project Manager: Jean Bolduc				Site Name: Peninsula Boulevard Site Site Location: Hewlett, NY	
Date of Session: 04/01/15 Scoping Session Purpose: Discuss logistics and field/laboratory activities for the work assignment (continuation of the remedial investigation for OU-2).					
Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Jean Bolduc	TL/Hydrogeologist	SERAS	732-321-4280	jean.m.bolduc@lmco.com	Task Leader
Jeff Catanzarita	ERT WAM	EPA/ERT	732-906-6929	catanzarita.jeff@epa.gov	Technical Direction

Comments/Decisions: A Change Order will be placed with the existing Purchase Order for an outside vendor to provide a direct-push technology (DPT) rig for soil and groundwater sampling. Soil samples may be collected for volatile organic compound (VOC) analysis at five-foot intervals from boreholes drilled to a maximum depth of approximately 45 feet at a vacant lot that is hydraulically upgradient of Cedarwood Cleaners. Additional boreholes will be drilled and sampled for groundwater VOC analysis at five-foot intervals between depths of 25 and 45 feet to further assess the extent of VOC groundwater contamination beneath that vacant property. Groundwater purged during the sampling will be passed through granular activated carbon and discharged on the ground surface. All soil cores will be field screened for VOCs using a flame-ionization detector (FID) or a toxic vapor analyzer (TVA). Up to two samples of investigation-derived waste (IDW) soil will be collected for characterization using the Toxicity Characteristic Leaching Procedure (TCLP) for volatiles, semi-volatiles, herbicides, pesticides, and metals plus mercury. The benchmarks for soil and groundwater are the same as previous mobilizations to the site. All samples will be analyzed through the EPA CLP. The field activities will be conducted over a 3 to 4-day period beginning April 27, 2015.

Action Items: The owner of the vacant property will need to be added as additional insured on Lockheed Martin's insurance policy. Proof that they have been added to the insurance policy is required by the property owner prior to his signing the access agreement with the EPA.

Consensus Decisions: The number of soil and groundwater samples will be determined in the field. An aqueous equipment blank will be collected at the end of the groundwater sampling program. Any soil IDW samples will be submitted for analysis to a CLP laboratory.

Action Items: ERT will provide a list of addresses for underground utility mark outs that will be conducted prior to mobilizing to the site.

Consensus Decisions: The purpose of the sampling is to further characterize potential sources for the VOC plumes detected in soil and groundwater beneath the area. The assessment data generated during this mobilization will be used for engineering design of an applicable source remedy.

QAPP Worksheet #10

Problem Definition

The problem to be addressed by the project:

ERT in conjunction with US EPA Region 2 will be conducting a site mobilization in April 2015 to further delineate soil and groundwater VOC contamination detected during previous environmental investigations of the Peninsula Boulevard Site in Hewlett, NY. SERAS will subcontract an outside vendor to conduct DPT drilling for soil and groundwater sampling at the vacant lot between Piermont Cleaners and Cedarwood Cleaners. These activities will be conducted over a three to four-day period.

The environmental questions being asked:

What is the nature and extent of the VOCs detected in the soil and groundwater at properties on the Peninsula Boulevard site?

Observations from any site reconnaissance reports:

The Peninsula Boulevard Groundwater Plume Superfund Site (Site) consists of the area within and around a groundwater plume located in the Village of Hewlett, Town of Hempstead, Nassau County, NY. The area consists of a mix of commercial and residential properties, with the majority of the commercial properties being located along Mill Road, Peninsula Boulevard, Broadway, and West Broadway.

A series of investigations and removal actions performed by the New York State Department of Environmental Conservation (NYSDEC) from 1991 to 1999 at the former Grove Cleaners site revealed an extensive groundwater contaminant plume extending both to the north and south of Peninsula Boulevard, primarily consisting of the chlorinated volatile organic compound tetrachloroethene (PCE). The results of these investigations determined that operations at the former Grove Cleaners, located at 1274 Peninsula Boulevard from 1987 to 1992, resulted in the disposal of hazardous substances, including the VOCs PCE and trichloroethylene (TCE) to the environment. In March 1991, the Nassau County Department of Health (NCDH) cited Grove Cleaners for discharging hazardous waste into on-site dry wells. PCE was detected in soil and sludge samples collected at the Grove Cleaners site and in other media at and near the property. The results of the investigation suggested the potential for additional source areas other than the former Grove Cleaners site. Following the implementation of interim remedial measures, which consisted of the removal of impacted soil related to solvent discharge to a dry well, a No Further Action remedy was selected by NYSDEC in March 2003 for the former Grove Cleaners site. On March 7, 2004, the EPA proposed inclusion of the site on the National Priorities List (NPL); on July 22, 2004, EPA placed the site on the NPL.

EPA conducted a Remedial Investigation (RI) at the Site from 2005 through 2010. Environmental sampling of groundwater, surface water, soil and sediment was performed and a Data Evaluation Report (DER) presenting the results of the environmental sampling was prepared in October 2008. Supplemental RI work was conducted in 2010 to address data gaps, including hydrogeological sampling and analyses, and to develop a baseline human health risk assessment (HHRA) and screening-level ecological risk assessment (SLERA). A DER Addendum was issued in December 2010 presenting the results of this sampling. An RI Report was released in June 2011. The RI identified groundwater contaminated with PCE, PCE-breakdown products, and low levels of other VOCs.

The source of the PCE groundwater contamination is suspected to be upgradient of the dry cleaning properties. To date, no viable Potentially Responsible Parties (PRPs) have been identified. However, previous environmental investigations conducted by SERAS in 2012 to 2015 at the dry cleaning properties and a vacant property detected soil and groundwater contamination.

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A synopsis of existing data or information from site reports:
Analytical results from soil vapor sampling conducted by SERAS in 2012 indicate that potential VOC contamination sources exist at three dry cleaners: Cedarwood Cleaners, Piermont Cleaners, and Former Vogue French Cleaners/Liberty Travel. A membrane interface probe hydraulic profiling tool (MiPHT) survey conducted by SERAS in 2013 indicated that Cedarwood Cleaners may be a primary source, Piermont Cleaners may be a secondary source of VOC contamination, and Former Vogue French Cleaner/Liberty Travel may be a lesser source of VOC contamination. Two groundwater samples collected along the public right-of-way adjacent to a vacant property hydraulically upgradient of Cedarwood Cleaners contained high concentrations of VOCs.
The possible classes of contaminants and the affected matrices:
VOC contamination of soil and groundwater. The target compounds of interest are primarily PCE and TCE.
The rationale for inclusion of chemical and nonchemical analyses:
Previous environmental investigations conducted by SERAS detected VOC contamination of soil and groundwater at the Peninsula Boulevard site.
Information concerning various environmental indicators:
None.
Project decision conditions (“If..., then...” statements):
If VOC contamination is detected in soil and groundwater samples, then the previous investigation results are verified and the data will be evaluated by EPA Region 2 to determine if further investigations for delineation are needed. This mobilization is to identify any additional sources and their boundaries; therefore, the project action limits will be used to guide these activities.

QAPP Worksheet #11
Project Quality Objectives /Systematic Planning Process Statements

Who will use the data? EPA Region 2
What will the data be used for? The data will be used by EPA Region 2 to verify and further delineate previous findings of VOC contamination at the identified dry cleaning properties and a vacant property. EPA Region 2 will also use additional soil and groundwater sampling data from in and around a vacant lot (located between Piermont Cleaners and Cedarwood Cleaners) to identify a potential source of groundwater contamination.
What type of data is needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques) CLP laboratory analytical results for VOCs in soil and groundwater samples. CLP analytical results for IDW soil characterization results. FID or TVA data for field screening VOCs in soil. Global positioning system (GPS) data for site borehole locations. The drivers for this site will be PCE and TCE.
How “good” do the data need to be in order to support the environmental decision? VOC analytical results for soil and groundwater are definitive laboratory data. Analytical results for the IDW soil characterization are screening laboratory data. Worksheets #12-1 and #28-1 show the measurement performance criteria that are needed for the quality indicators. Worksheet #20 outlines the field quality control sample requirements. GPS and FID/TVA data are screening or semi-quantitative data.
How much data are needed? (number of samples for each analytical group, matrix, and concentration) This is a continuation of the October 2014 and January 2015 field investigations. The total number of soil and groundwater samples will be determined in the field. Soil samples may be collected from locations at a vacant property hydraulically upgradient of Cedarwood Cleaners. Groundwater samples will be collected from boreholes drilled at the vacant property. The soil and groundwater samples will be analyzed for VOCs. A maximum of two soil samples will be collected for waste characterization at the discretion of the WAM from soil cuttings produced during the drilling. These samples will be analyzed by a CLP laboratory using the TCLP, EPA/SW-846 Method 1311 as an extraction method, followed by the appropriate EPA SW-846 analytical methods listed in Worksheet #15 for volatiles, semi-volatiles, pesticides, herbicides, and metals.
Where, when, and how should the data be collected/generated? Soil samples will be collected in a macrocore sampler and groundwater samples will be collected via an SP-16 or SP-22 groundwater sampler. A full-size Geoprobe rig will be used to access the soil and groundwater. Soil samples will be collected at five-foot intervals to a maximum depth of 45 feet at interior locations and groundwater samples will be collected in between depths of 25 and 45 feet at exterior locations from the Geoprobe driven holes. Analytical results will be generated for groundwater and soil samples. After the soil sampling is completed, soil samples will be collected for TCLP waste characterization from soil cuttings contained in buckets.
Who will collect and generate the data? Soil and groundwater samples will be collected by SERAS and relinquished to a CLP laboratory for analysis. Environmental Services Assessment Team (ESAT) will validate the analytical results. GPS and TVA/FID data will be collected by SERAS personnel.
How will the data be reported? Validated CLP data for soil and groundwater samples and preliminary CLP data for IDW soil samples will be reported directly to the WAM and forwarded on to the SERAS TL. A final Trip Report, prepared in accordance with SERAS Standard Operating Procedure (SOP) #4017, <i>Preparation of Trip Reports</i> , will be the final deliverable to the EPA/ERT WAM. Data will be disseminated to EPA Region 2 by the ERT WAM.

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How will the data be archived?

Hard copies of all deliverables will be stored in SERAS Central Files and e-copies will be stored on the SERAS local area network (LAN). Analytical results and GPS data will be imported into a Scribe database and posted to the ERT- IMS website. All deliverables will be archived by SERAS in accordance with Administrative Procedure (AP) #34, *Archiving Electronic Files*.

QAPP Worksheet 12-1 Measurement Performance Criteria Table

Matrix	Aqueous/Soil				
Analytical Group	TCL Volatiles				
Concentration Level	Low/Medium (ug/kg, ug/L)				
Sampling Procedure¹	Analytical Method/SOP²	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOPs #2007 or #2012	SOM01.2	Precision (field)	± 35% RPD for soil ± 20% RPD for aqueous	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Equipment (Field) Blank/Method Blank	S & A
		Precision (laboratory)	± 35% RPD for soil and ± 20% RPD for aqueous; List compound specific RPD	Field Duplicate; MS/MSD**	S & A; A
		Accuracy (laboratory)	List compound specific %R	***DMCs; MS/MSD**	A
		Completeness	> 90% water/soil sampling > 90% laboratory analysis	Data Completeness Check	S & A

¹Reference number from QAPP Worksheet #21

²Reference number from QAPP Worksheet #23

*Reference USEPA Region 2 SOP No. 34/Trace VOA – Blank Type Criteria Table

**Optional MS/MSD – Reference CLP SOM01.2 Exhibit D, Table 6 for Criteria

***Deuterated Monitoring Compounds (DMCs) – Reference CLP SOM01.2, Exhibit D, Table 5 for Criteria

RPD = Relative Percent Difference

CRQL = Contract Required Quantitation Limit

MS/MSD = Matrix Spike/Matrix Spike Duplicate

%R = Percent Recovery

QAPP Worksheet 12-2
Measurement Performance Criteria Table

Matrix	IDW Soil				
Analytical Group	TCLP Volatiles				
Concentration Level	Low				
Sampling Procedure¹	Analytical Method/SOP²	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2009	EPA SW-846 Method 1311/8260C	Precision	RPD within laboratory control chart limits	Laboratory Duplicates	A
		Accuracy/Bias	%R \pm 30% or within laboratory control chart limits	Laboratory Control Sample (LCS)	A
		Precision (laboratory)	50-200% of area of CCAL or Mid ICAL	Internal Standards	A
		Accuracy/Bias	%R = Within laboratory control chart limits	Surrogate Spike	A
		Accuracy/Bias	<RL	Method Blank	A
		Accuracy/Bias	%R = Within laboratory control chart limits	MS	S & A
		Sensitivity	Tune Criteria – See Table 3 of 8260C	Instrument Performance Check	A
		Completeness	>90% sampling completed >90% laboratory analysis	Data Completeness Check	S & A

¹Reference number from QAPP Worksheet #21-3

²Reference number from QAPP Worksheet #23-3

CCAL – continuing calibration

ICAL – initial calibration

QAPP Worksheet 12-3
Measurement Performance Criteria Table

Matrix	IDW Soil				
Analytical Group	TCLP Semi-Volatiles				
Concentration Level	Low				
Sampling Procedure¹	Analytical Method/SOP²	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2009	EPA SW-846 Method 1311/8270D	Precision	RPD Within laboratory control chart limits	Laboratory Duplicates	A
		Accuracy/Bias	%R \pm 30% or within laboratory control chart limits	LCS	A
			50-200% of area of CCAL or Mid ICAL	Internal Standards	A
			%R = Within laboratory control chart limits	Surrogate Spikes	A
			<RL	Method Blank	A
			%R = Within laboratory control chart limits	MS	S & A
		Sensitivity	Tune Criteria – See Table 3 of 8270D	Instrument Performance Check	A
		Completeness	>90% sampling completed >90% laboratory analysis	Data Completeness Check	S & A

¹Reference number from QAPP Worksheet #21

²Reference number from QAPP Worksheet #23

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QAPP Worksheet 12-4 Measurement Performance Criteria Table

Matrix	IDW Soil				
Analytical Group	TCLP Herbicides				
Concentration Level	Low				
Sampling Procedure¹	Analytical Method/SOP²	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2009	EPA SW-846 Method 1311/8151A	Precision	RPD Within laboratory control chart limits	Laboratory Duplicates	A
		Accuracy/Bias	%R \pm 30% or within laboratory control chart limits	LCS	A
			%R = Within laboratory control chart limits	Surrogate Spikes	A
			<RL	Method Blank	A
			%R = Within laboratory control chart limits	Matrix Spikes	S & A
		Completeness	>90% sampling completed >90% laboratory analysis	Data Completeness Check	S & A

¹Reference number from QAPP Worksheet #21

²Reference number from QAPP Worksheet #23

QAPP Worksheet 12-5
Measurement Performance Criteria Table

Matrix	IDW Soil				
Analytical Group	TCLP Pesticides				
Concentration Level	Low				
Sampling Procedure¹	Analytical Method/SOP²	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2009	EPA SW-846 Method 1311/8081B	Precision	RPD Within laboratory control chart limits	Laboratory Duplicates	A
		Accuracy/Bias	%R \pm 30% or within laboratory control chart limits	LCS	A
			%R = Within laboratory control chart limits	Surrogate Spikes	A
			<RL	Method Blank	A
			%R = Within laboratory control chart limits	MS	S & A
		Completeness	>90% sampling completed >90% laboratory analysis	Data Completeness Check	S & A

¹Reference number from QAPP Worksheet #21

²Reference number from QAPP Worksheet #23

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QAPP Worksheet 12-6 Measurement Performance Criteria Table

Matrix	IDW Soil				
Analytical Group	TCLP Metals				
Concentration Level	Low				
Sampling Procedure¹	Analytical Method/SOP²	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
SERAS SOP #2009	EPA/SW-846 Method 1311/6010C/7470A	Precision	±20% RPD	Laboratory Duplicates	A
		Accuracy/Bias	%R 80-120	LCS	A
			%R 75-125	MS	S & A
			<RL	Method Blank	A
			%R 80-120	Post Spike (ICP only)	A
			%D ±10%	Serial Dilution (ICP only)	A
		Completeness	>90% sampling completed >90% laboratory analysis	Data Completeness Check	S & A

¹Reference number from QAPP Worksheet #21

²Reference number from QAPP Worksheet #23

ICP – Inductively Coupled Plasma

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QAPP Worksheet #13
Existing Data Criteria and Limitations Table

Existing Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Soil Gas and Groundwater Sampling Data	SERAS, Peninsula Boulevard Site, Hewlett, New York, February 2012 Soil Gas and Ground Water Sampling Work Assignment #SER00149 – Trip Report	SERAS, Definitive Data, Soil Gas and Groundwater Sampling Data, Collected February 6 to 10, 2012	The soil gas and groundwater sampling data will be used to identify MiHPT sampling locations at each of the three dry cleaner sites involved in this investigation.	None
MiHPT Survey Data	S2C2, Subsurface Characterization Using Membrane Interface Probe (MIP) With Heated Trunkline, Town of Hewlett, New York, July 19, 2013	S2C2, Inc., Screening Data, MiHPT data collected June 17 through 27, 2013	The MiHPT data will be used to identify soil borehole and groundwater monitor well locations for sampling at each of the three dry cleaner sites involved in this assessment.	None
Soil and Groundwater Sampling Data	SERAS, Peninsula Boulevard Site, Hewlett, New York, Draft Technical Memorandum, SERAS-0149-DTM-031215	SERAS, Definitive Data, Soil Gas, MiHPT, Soil and Groundwater Sampling Data, Collected from January 2012 through January 2015	Data will be used to guide the continuation of the delineation effort in 2015.	None

QAPP Worksheet #14 **Summary of Project Tasks**

Sampling Tasks:

SERAS personnel will collect soil samples (number to be determined by the WAM) in accordance with SERAS SOP #2012, *Soil Sampling*. SERAS personnel will collect groundwater samples (number to be determined by the WAM) in accordance with SERAS SOP #2007, *Groundwater Well Sampling* in conjunction with Geoprobe SP-16 or SP-22 sampler operating instructions. SERAS personnel will collect up to two samples of IDW soil from buckets for waste characterization using TCLP volatiles, semi-volatiles, pesticides, herbicides and metals.

Analysis Tasks:

Soil and groundwater samples will be analyzed for VOCs through the CLP. The standard CLP target analyte list will be used (see Worksheets #15-1).

Waste characterization samples will be analyzed through the CLP using TCLP, EPA/SW-846 Method 1311 as an extraction method, and appropriate EPA SW-846 analytical methods for volatiles, semi-volatiles, pesticides, herbicides, and metals (see Worksheet #23). The target analyte list will be comprised of the constituents listed in Table 1 of the TCLP Method. Target analyte lists are presented for individual analytical groups in Worksheets #15-2 through #15-7.

Quality Control Tasks:

SERAS will collect QA/QC samples for the soil and groundwater sampling in accordance with EPA CLP guidelines or policies and SERAS SOP #2005, *Quality Assurance/Quality Control Samples*. Field QA/QC samples are described on Worksheet #20 and analytical QA/QC samples are listed on Worksheet #28. QA/QC samples will not be collected for the waste characterization sampling.

Existing Data:

Refer to Worksheet #13.

Data Management Tasks:

All soil borehole and groundwater sample locations will be identified by a field assigned number. All soil, groundwater, and waste characterization samples will be identified by a CLP assigned number. All deliverables will be generated in accordance to the appropriate SERAS SOP and posted to the ERT-IMS website upon completion. Posting to the ERT-IMS site will be considered as completion of the deliverable.

Documentation and Records:

All documentation will be recorded in accordance with SERAS SOP #4001, *Logbook Documentation*. The Trip Report will provide a description of the project; field methodologies and results, and will be prepared in accordance with SERAS SOP #4017, *Preparation of Trip Report*. Documents and records that may be generated during this project include: amended Work Plan (WP), revised QAPP, modified HASP, Scribe database, and Trip Report.

Assessment/Audit Tasks:

No performance audit of field operations is anticipated for this project. The tasks associated with this revised QAPP are assessed using peer reviews and management system reviews. Peer review enables reporting errors to be corrected before reports are submitted. Management system reviews establish compliance with prevailing management structure, policies and procedures, and ensures that the required data are obtained.

Data Review Tasks:

All project deliverables will receive an internal peer review prior to release, per guidelines established in the SERAS AP #22, *Peer Review of SERAS Deliverables*.

Analytical data deliverables for CLP laboratories will be in accordance with the U.S. EPA CLP *Multi-Media Multi-Concentration Organic Analysis [SOM01.2]*. The organic data will be validated according to U.S. EPA/DESA/HWSS SOP Number HW-33/ *Low/Medium Volatile Data Validation*, Revision 3.

Data validation will not be conducted for the soil waste characterization samples.

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QAPP Worksheet 15-1
Reference Limits and Evaluation Table

Matrix: Soil

Analytical Group: TCL Volatiles

Concentration Level: Low and Medium

Analyte	CAS Number	Project Action Limit NYSDEC 6NYCRR Part 375 (mg/kg)**	Project Quantitation Limit (mg/kg)	Analytical Method – SOM01.2 (Low) Quantitation Limits (mg/kg)	Analytical Method – SOM01.2 (Medium) Quantitation Limits (mg/kg)
Dichlorodifluoromethane	75-71-8	NS	0.005	0.005	0.25
Chloromethane	74-87-3	NS	0.005	0.005	0.25
Vinyl Chloride	75-01-4	0.02	0.005	0.005	0.25
Bromomethane	74-83-9	NS	0.005	0.005	0.25
Chloroethane	75-00-3	NS	0.005	0.005	0.25
Trichlorofluoromethane	75-69-4	NS	0.005	0.005	0.25
1,1-Dichloroethene	75-35-4	0.33	0.005	0.005	0.25
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NS	0.005	0.005	0.25
Acetone	67-64-1	0.05	0.01	0.01	0.5
Carbon Disulfide	75-15-0	NS	0.005	0.005	0.25
Methyl Acetate	79-20-9	NS	0.005	0.005	0.25
Methylene Chloride	75-09-2	0.05	0.005	0.005	0.25
trans-1,2-Dichloroethene	156-60-5	0.19	0.005	0.005	0.25
Methyl tert-Butyl Ether	1634-04-4	0.93	0.005	0.005	0.25
1,1-Dichloroethane	75-34-3	0.27	0.005	0.005	0.25
cis-1,2-Dichloroethene	156-59-2	0.25	0.005	0.005	0.25
2-Butanone (MEK)	78-93-3	0.12	0.01	0.01	0.5
Bromochloromethane	74-97-5	NS	0.005	0.005	0.25
Chloroform	67-66-3	0.37	0.005	0.005	0.25
1,1,1-Trichloroethane	71-55-6	0.68	0.005	0.005	0.25
Cyclohexane	110-82-7	NS	0.005	0.005	0.25
Carbon Tetrachloride	56-23-5	0.76	0.005	0.005	0.25
Benzene	71-43-2	0.06	0.005	0.005	0.25
1,2-Dichloroethane	107-06-2	0.02	0.005	0.005	0.25
1,4-Dioxane	123-91-1	0.1 ⁽¹⁾	0.100	0.100	5.0
Trichloroethene	79-01-6	0.47	0.005	0.005	0.25
Methylcyclohexane	108-87-2	NS	0.005	0.005	0.25
Bromodichloromethane	75-27-4	NS	0.005	0.005	0.25

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QAPP Worksheet #15-1
Reference Limits and Evaluation Table

Matrix: Soil

Analytical Group: TCL Volatiles-Continued

Concentration Level: Low and Medium

Analyte	CAS Number	NYSDEC 6NYCRR Part 375 (mg/kg)**	Project Quantitation Limit (mg/kg)	Analytical Method – SOM01.2 (Low) Quantitation Limits (mg/kg)	Analytical Method – SOM01.2 (Medium) Quantitation Limits (mg/kg)
1,2-Dichloropropane	78-87-5	NS	0.005	0.005	0.25
Toluene	108-88-3	0.7	0.005	0.005	0.25
trans-1,3-Dichloropropene	10061-02-6	NS	0.005	0.005	0.25
cis-1,3-Dichloropropene	10061-01-5	NS	0.005	0.005	0.25
4-Methyl-2-Pentanone	108-10-1	NS	0.01	0.01	0.25
1,1,2-Trichloroethane	79-00-5	NS	0.005	0.005	0.25
Tetrachloroethene	127-18-4	1.3	0.005	0.005	0.25
2-Hexanone	591-78-6	NS	0.01	0.01	0.5
Dibromochloromethane	124-48-1	NS	0.005	0.005	0.25
1,2-Dibromoethane	106-93-4	NS	0.005	0.005	0.25
Chlorobenzene	108-90-7	1.1	0.005	0.005	0.25
Ethylbenzene	100-41-4	1.0	0.005	0.005	0.25
o-Xylene	95-47-6	NS	0.005	0.005	0.25
m/p-Xylene	108-38-3/106-42-3	NS	0.005	0.005	0.25
Xylenes (total)	1330-20-7	0.26	0.005	0.005	0.25
Styrene	100-42-5	NS	0.005	0.005	0.25
Bromoform	75-25-2	NS	0.005	0.005	0.25
Isopropylbenzene	98-82-8	NS	0.005	0.005	0.25
1,1,2,2-Tetrachloroethane	79-34-5	NS	0.005	0.005	0.25
1,3-Dichlorobenzene	541-73-1	2.4	0.005	0.005	0.25
1,4-Dichlorobenzene	106-46-7	1.8	0.005	0.005	0.25
1,2-Dichlorobenzene	95-50-1	1.1	0.005	0.005	0.25
1,2-Dibromo-3-chloropropane	96-12-8	NS	0.005	0.005	0.25
1,2,4-Trichlorobenzene	120-82-1	NS	0.005	0.005	0.25
1,2,3-Trichlorobenzene	87-61-6	NS	0.005	0.005	0.25

**New York State Department of Environmental Conservation (NYSDEC), December 2006, 6 NYCRR Part 375 Environmental Remediation Programs, Subpart 375-6: Remedial Program Soil Cleanup Objectives (SCOs). Value listed from Table 375-6.8(a) for Unrestricted Use SCOs. The SCOs for unrestricted use were capped at a maximum value of 100 ppm. This value represents the lower of the restricted industrial SCO and the protection of ecological resources SCO.

(1) For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

NS = not specified in **

mg/kg = milligrams per kilogram

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QAPP Worksheet 15-2
Reference Limits and Evaluation Table

Matrix: Aqueous

Analytical Group: TCL Volatiles

Concentration Level: Trace and Low

Analyte	CAS Number	Project Action Limits NYSDEC 6NYCRR Part 703 (ug/L)**	Project Quantitation Limit (ug/L)	Analytical Method – SOM01.2 (Trace) Quantitation Limits (ug/L)	Analytical Method – SOM01.2 (Low) Quantitation Limits (ug/L)
Dichlorodifluoromethane	75-71-8	5	0.5	0.5	5
Chloromethane	74-87-3	NS	0.5	0.5	5
Vinyl Chloride	75-01-4	2	0.5	0.5	5
Bromomethane	74-83-9	5	0.5	0.5	5
Chloroethane	75-00-3	5	0.5	0.5	5
Trichlorofluoromethane	75-69-4	5	0.5	0.5	5
1,1-Dichloroethene	75-35-4	5	0.5	0.5	5
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5	0.5	0.5	5
Acetone	67-64-1	NS	5	5	10
Carbon Disulfide	75-15-0	60	0.5	0.5	5
Methyl Acetate	79-20-9	NS	0.5	0.5	5
Methylene Chloride	75-09-2	5	0.5	0.5	5
trans-1,2-Dichloroethene	156-60-5	5	0.5	0.5	5
Methyl tert-Butyl Ether	1634-04-4	NS	0.5	0.5	5
1,1-Dichloroethane	75-34-3	5	0.5	0.5	5
cis-1,2-Dichloroethene	156-59-2	5	0.5	0.5	5
2-Butanone (MEK)	78-93-3	NS	5	5	10
Bromochloromethane	74-87-5	NS	0.5	0.5	5
Chloroform	67-66-3	7	0.5	0.5	5
1,1,1-Trichloroethane	71-55-6	5	0.5	0.5	5
Cyclohexane	110-82-7	NS	0.5	0.5	5
Carbon Tetrachloride	56-23-5	5	0.5	0.5	5
Benzene	71-43-2	1	0.5	0.5	5
1,2-Dichloroethane	107-06-2	0.6	0.5	0.5	5
1,4-Dioxane	123-91-1	NS	100	-	100
Trichloroethene	79-01-6	5	0.5	0.5	5
Methylcyclohexane	108-87-2	NS	0.5	0.5	5
Bromodichloromethane	75-27-4	5	0.5	0.5	5

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QAPP Worksheet #15-2
Reference Limits and Evaluation Table

Matrix: Aqueous

Analytical Group: TCL Volatiles-Continued

Concentration Level: Trace and Low

Analyte	CAS Number	Project Action Limits NYSDEC 6NYCRR Part 703 (µg/L)**	Project Quantitation Limit (µg/L)	Analytical Method – SOM01.2 (Trace) Quantitation Limits (µg/L)	Analytical Method – SOM01.2 (Low) Quantitation Limits (µg/L)
1,2-Dichloropropane	78-87-5	1	0.5	0.5	5
Toluene	108-88-3	5	0.5	0.5	5
trans-1,3-Dichloropropene	10061-02-6	0.4	0.5	0.5	5
cis-1,3-Dichloropropene	10061-01-5	NS	0.5	0.5	5
4-Methyl-2-Pentanone	108-10-1	NS	5	5	10
1,1,2-Trichloroethane	79-00-5	1	0.5	0.5	5
Tetrachloroethene	127-18-4	5	0.5	0.5	5
2-Hexanone	591-78-6	NS	5	5	10
Dibromochloromethane	124-48-1	NS	0.5	0.5	5
1,2-Dibromoethane	106-93-4	NS	0.5	0.5	5
Chlorobenzene	108-90-7	5	0.5	0.5	5
Ethylbenzene	100-41-4	5	0.5	0.5	5
o-Xylene	95-47-6	5	0.5	0.5	5
m/p-Xylene	108-38-3/106-42-3	5	0.5	0.5	5
Xylenes (total)	1330-20-7	5	0.5	0.5	5
Styrene	100-42-5	5	0.5	0.5	5
Bromoform	75-25-2	NS	0.5	0.5	5
Isopropylbenzene	98-82-8	5	0.5	0.5	5
1,1,2,2-Tetrachloroethane	79-34-5	5	0.5	0.5	5
1,3-Dichlorobenzene	541-73-1	5	0.5	0.5	5
1,4-Dichlorobenzene	106-46-7	5	0.5	0.5	5
1,2-Dichlorobenzene	95-50-1	5	0.5	0.5	5
1,2-Dibromo-3-chloropropane	96-12-8	0.04	0.5	0.5	5
1,2,4-Trichlorobenzene	120-82-1	5	0.5	0.5	5
1,2,3-Trichlorobenzene	87-61-6	NS	0.5	0.5	5

**New York State Department of Environmental Conservation (NYSDEC), August 1999, 6 NYCRR Part 703 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations. Value listed from Table 1 of Section 703.5 for Class GA waters and Health Water Source standards.

NS = not specified in **

µg/L = micrograms per liter.

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QAPP Worksheet #15-3 Reference Limits and Evaluation Table

Matrix: IDW Soil
Analytical Group: TCLP VOCs
Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (mg/L)	Project Quantitation Limit (mg/L)	EPA Method 8260C Achievable Laboratory Limits		Achievable Laboratory Limits	
				MDLs	Method QLs (mg/L)	MDLs	QLs
2-Butanone	78-93-3	200	Lab-specific	NS	NS	Lab-specific	Lab-specific
1,1-Dichloroethene	75-35-4	0.70	Lab-specific	NS	NS	Lab-specific	Lab-specific
1,2-Dichloroethane	107-06-2	0.50	Lab-specific	NS	NS	Lab-specific	Lab-specific
1,4-Dichlorobenzene	106-46-7	7.5	Lab-specific	NS	NS	Lab-specific	Lab-specific
Benzene	71-43-2	0.50	Lab-specific	NS	NS	Lab-specific	Lab-specific
Carbon Tetrachloride	56-23-5	0.50	Lab-specific	NS	NS	Lab-specific	Lab-specific
Chlorobenzene	108-90-7	100	Lab-specific	NS	NS	Lab-specific	Lab-specific
Chloroform	67-66-3	6.0	Lab-specific	NS	NS	Lab-specific	Lab-specific
Tetrachloroethene	127-18-4	0.70	Lab-specific	NS	NS	Lab-specific	Lab-specific
Trichloroethene	79-01-6	0.50	Lab-specific	NS	NS	Lab-specific	Lab-specific
Vinyl Chloride	75-01-4	0.20	Lab-specific	NS	NS	Lab-specific	Lab-specific

*Project Action Limit = Regulatory level for the Toxicity Characteristic of a solid waste listed in 40 CFR 261.24
 mg/L = milligrams per liter
 NS = Not Specified

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QAPP Worksheet #15-4 Reference Limits and Evaluation Table

Matrix: IDW Soil
Analytical Group: TCLP SVOCs
Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (mg/L)	Project Quantitation Limit (mg/L)	EPA Method 8270D Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs (mg/L)	MDLs	QLs
1,4-Dichlorobenzene	106-46-7	7.5	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
2,4,5-Trichlorophenol	95-95-4	400	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
2,4,6-Trichlorophenol	88-06-2	2.0	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
2,4-Dinitrotoluene	121-14-2	0.13	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
Hexachlorobenzene	118-74-1	0.13	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
Hexachlorobutadiene	87-68-3	0.50	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
Hexachloroethane	67-72-1	3.0	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
Nitrobenzene	98-95-3	2.0	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
Pentachlorophenol	87-86-5	100	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
Pyridine	110-86-1	5.0	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific
Total Cresols	NA	200	Lab-specific	NS	Lab-specific	Lab-specific	Lab-specific

*Project Action Limit = Regulatory level for the Toxicity Characteristic of a solid waste listed in 40 CFR 261.24

mg/L = milligrams per liter

NS = Not Specified

NA = Not Available

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QAPP Worksheet #15-5 Reference Limits and Evaluation Table

Matrix: IDW Soil

Analytical Group: TCLP Pesticides

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (mg/L)	Project Quantitation Limit (mg/L)	EPA Method 8081B Analytical Method		Achievable Laboratory Limits	
				MDLs	Method QLs	MDLs	QLs
Chlordane	12789-03-6	0.030	Lab-specific	NS	NS	Lab-specific	Lab-specific
Endrin	72-20-8	0.020	Lab-specific	NS	NS	Lab-specific	Lab-specific
Heptachlor	76-44-8	0.008	Lab-specific	NS	NS	Lab-specific	Lab-specific
Heptachlor Epoxide	1024-57-3	0.008	Lab-specific	NS	NS	Lab-specific	Lab-specific
Lindane	58-89-9	0.040	Lab-specific	NS	NS	Lab-specific	Lab-specific
Methoxychlor	72-43-5	10.0	Lab-specific	NS	NS	Lab-specific	Lab-specific
Toxaphene	8001-35-2	0.50	Lab-specific	NS	NS	Lab-specific	Lab-specific

*Project Action Limit = Regulatory level for the Toxicity Characteristic of a solid waste listed in 40 CFR 261.24.

NS = Not Specified

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QAPP Worksheet #15-6
Reference Limits and Evaluation Table

Matrix: IDW Soil

Analytical Group: TCLP Herbicides

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (mg/L)	Project Quantitation Limit (mg/L)	EPA Method 8151A Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	Method QLs	MDLs	QLs
2,4-D	94-75-7	10.0	Lab-specific	0.0002	NS	Lab-specific	Lab-specific
2,4,5-TP	93-72-1	1.0	Lab-specific	0.000075	NS	Lab-specific	Lab-specific

*Project Action Limit = Regulatory level for the Toxicity Characteristic of a solid waste listed in 40 CFR 261.24

NS = Not Specified

2,4-D = 2,4-Dichlorophenoxyacetic acid

2,4,5-TP = 2-(2,4,5-trichloro phenoxy) propionic acid

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QAPP Worksheet #15-7 Reference Limits and Evaluation Table

Matrix: IDW Soil

Analytical Group: TCLP Metals

Concentration Level: Low

Analyte	CAS Number	Project Action Limit * (mg/L)	Project Quantitation Limit (mg/L)	EPA Methods 6010C/7470A Analytical Method		Achievable Laboratory Limits	
				MDLs (mg/L)	Method QLs	MDLs	QLs
Arsenic	7440-38-2	5.0	Lab-specific	NS	NS	Lab-specific	Lab-specific
Barium	7440-39-3	100	Lab-specific	NS	NS	Lab-specific	Lab-specific
Cadmium	7440-43-9	1.0	Lab-specific	NS	NS	Lab-specific	Lab-specific
Chromium	7440-47-3	5.0	Lab-specific	NS	NS	Lab-specific	Lab-specific
Lead	7439-92-1	5.0	Lab-specific	NS	NS	Lab-specific	Lab-specific
Mercury	7439-97-6	0.2	Lab-specific	NS	0.0005	Lab-specific	Lab-specific
Selenium	7782-49-2	1.0	Lab-specific	NS	NS	Lab-specific	Lab-specific
Silver	7440-22-4	5.0	Lab-specific	NS	NS	Lab-specific	Lab-specific

*Project Action Limit = Regulatory level for the Toxicity Characteristic of a solid waste listed in 40 CFR 261.24

NS = Not Specified

QAPP Worksheet #16
Project Schedule Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Quality Assurance Project Plan	SERAS	04/06/2015	04/23/2015	Revised QAPP	04/27/2015
Field Work	SERAS	04/27/2015	04/30/2015	NA	NA
Soil & Groundwater Sample Analysis	CLP Laboratory	04/28/2015	05/22/2015	Data Package	21 days after completion of analysis
IDW (Soil) Characterization Sample Analysis	CLP (Subcontracted) Laboratory	05/01/2015	05/22/2015	Data Package	21 days after completion of analysis
Soil and Groundwater Sample Data Validation	ESAT	05/22/2015	06/12/2015	Validation Report	21 days after completion of analysis
Draft Trip Report	SERAS	Upon receipt of final data package	10 business days after receipt of CLP Final Data Package	Draft Trip Report	10 business days after receipt of CLP Final Data Package
Final Trip Report	SERAS	TBD	5 business days after receipt of WAMs comments on draft	Final Trip Report	5 business days after receipt of WAMs comments on draft

TBD – To Be Determined

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QAPP Worksheet #17
Sampling Design and Rationale

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach):

EPA Region 2 and ERT personnel will determine sampling locations at the vacant property immediately upgradient of Cedarwood Cleaners during this mobilization. All sampling will be judgmental and the sampling locations will be selected based on the presence of VOC concentrations detected in the soil and groundwater during previous environmental investigations at the site.

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations)

The delineation and source identification boreholes will be drilled to a maximum depth approximately 45 feet in the unconsolidated coarse-grained deposits of the Upper Glacial Aquifer at the vacant property. The number of soil and groundwater samples is TBD. All samples will be analyzed for VOCs.

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QAPP Worksheet #18
Survey Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth (feet)	Analytical Group	Concentration Level	Number of Samples (identify field duplicates)	Sampling SOP Reference¹	Rationale for Sampling Location²
All/TBD (Vacant Property Contamination Delineation)	Soil	0-45 feet at 5-foot intervals	VOC	Low/Medium	TBD (field duplicates 1:20)	2012	Judgmental
All/TBD (Contamination Delineation)	Aqueous	0-45 feet at 5-foot intervals between 20 and 45 feet	VOC	Trace/Low	TBD (field duplicates 1:20)	2001	Judgmental

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #21)

²Refer to Worksheet #17

QAPP Worksheet #19
Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference ¹	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/analysis)
Soil	TCL Volatile Organics [CLP]	Low/Medium	SOM01.2	15 grams	(3) 5-gram EnCore®	Cool to 4°C	48 hours (from time of sample collection)
	Percent Moisture [CLP]	NA	SOM01.2	50 grams	(1) 4 oz. jar	NA	NA
Aqueous	TCL Volatile Organics [CLP]	Trace/Low	SOM01.2	120 mL	(3) 40 mL vials	Cool to 4°C pH <2 with 1:1 HCl	14 days
Investigation-Derived Waste Soil	TCLP VOCs	Low	Prep: EPA SW-846 1311 Analysis: EPA SW-846 Method: 8260C	50 g	(2) 16-oz. clear wide-mouth glass jar w/ Teflon lined cap	Cool to 4°C	14 days (extraction), 14 days (analysis)
	TCLP SVOCs	Low	Prep: EPA SW-846 1311 Analysis: EPA SW-846 Method: 8270D	150 g			14 days (leachate prep.) 14 days (extraction), 40 days (analysis)
	TCLP Pesticides	Low	Prep: EPA SW-846 1311 Analysis: EPA SW-846 Method: 8081B	150 g			14 days (leachate prep.) 14 days (extraction), 40 days (analysis)
	TCLP Herbicides	Low	Prep: EPA SW-846 1311 Analysis: EPA SW-846 Method: 8151A	150 g			14 days (leachate prep.) 14 days (extraction), 40 days (analysis)
	TCLP Metals + Hg	Low	Prep: EPA SW-846 1311 Analysis: EPA SW-846 Method: 6010C/7470A	150 g			Mercury: 28 days (extraction/analysis) Other metals: 180 days (extraction/analysis)

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #20
Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference ¹	No. of Sampling Locations	No. of Field Duplicate Pairs	Inorganic No. of MS	No. of Trip Blanks	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab
Soil (Contamination Delineation)	VOC	Low/Medium	CLP SOM01.2	TBD	5%	NA	0	0	0	TBD
Aqueous	VOC	Trace/Low	CLP SOM01.2	TBD	5%	NA	TBD	1	0	TBD
Soil (Waste Characterization)	VOC	Low	EPA SW-846 Method 8260C	2	0	NA	0	0	0	2
Soil (Waste Characterization)	SVOC	Low	EPA SW-846 Method 8270D	2	0	NA	0	0	0	2
Soil (Waste Characterization)	Chlorinated Herbicides	Low	EPA SW-846 Method 8270D	2	0	NA	0	0	0	2
Soil (Waste Characterization)	Pesticides	Low	EPA SW-846 Method 8151A	2	0	NA	0	0	0	2
Soil (Waste Characterization)	Metals	Low	EPA SW-846 Method 6010C	2	0	NA	0	0	0	2
Soil (Waste Characterization)	Mercury	Low	EPA SW-846 Method 7470A	2	0	NA	0	0	0	2
Soil (Waste Characterization)	TCLP	NA	EPA SW-846 Method 1311	2	0	NA	0	0	0	2

TBD - To Be Determined

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QAPP Worksheet #21
Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Check if yes)	Comments
2001	General Field Sampling Guidelines	SERAS	General Sampling		
2002	Sample Documentation	SERAS	General Sampling		
2003	Sample Storage, Preservation and Handling	SERAS	General Sampling		
2004	Sample Packaging and Shipment	SERAS	General Sampling		
2005	Quality Assurance/Quality Control Samples	SERAS	General Sampling		
2006	Sampling Equipment Decontamination	SERAS	General Sampling		
2007	Groundwater Well Sampling	SERAS	General Sampling	Yes	In conjunction with SP-16 or SP-22 Geoprobe samplers
2009	Drum Sampling	SERAS	General Sampling	Yes	In conjunction with IDW sampling of soil cuttings in buckets
2012	Soil Sampling	SERAS	Sampling Equipment		
2075	Description and Identification of Soils	SERAS	Soil Sampling		
4001	Logbook Documentation	SERAS	Site Activities		
4005	Chain of Custody Procedures	SERAS	General Sampling		

QAPP Worksheet #22
Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment/ Instrument	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference ¹
GeoExplorer 3000 Series Global Positioning System Receiver	None	Keep batteries charged	Field performance	Visual inspection	At time of use	Receives GPS satellite	Send to manufacturer for repair and calibration	J. Bolduc	Manufacturer's manual
TVA	Zero and span	Check/replace battery; clean sensors, download once per quarter	Bump test	Visual inspection	Monthly and/or before each use	+/- 10%	Check gas concentration, recalibrate, clean sensor	J. Bolduc	Manufacturer's manual
MultiRAE Pro 10.6eV PID	Zero and Span	Clean PID sensor and lamp as needed	Bump test	Visual inspection	Monthly and/or before each use	+/- 10%	Check gas concentration. Recalibrate, or clean sensor and lamp and recalibrate	J. Bolduc	Manufacturer's manual

¹Specify the appropriate reference letter or number from the Project Sampling SOP References table (Worksheet #21).

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QAPP Worksheet #23
Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?
CLP SOM01.2	USEPA Contract Laboratory Program Statement of Work for Multi-Media, Multi-Concentration Organic Analysis; October 2006	Definitive	VOC	GC/MS	CLP	No
EPA/SW-846 Method 8260C	Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) or equivalent	Screening	VOCs	GC/MS	Region 2 Assigned Laboratory	No
EPA/SW-846 Method 8270D	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) or equivalent	Screening	SVOCs	GC/MS	Region 2 Assigned Laboratory	No
EPA/SW-846 Method 8151A	Chlorinated Herbicides by GC Using Methylation or Pentafluorobenzylation Derivatization or equivalent	Screening	Herbicides	GC/ECD	Region 2 Assigned Laboratory	No
EPA/SW-846 Method 8081B	Organochlorine Pesticides by Gas Chromatography or equivalent	Screening	Pesticides	GC/ECD	Region 2 Assigned Laboratory	No
EPA/SW-846 Method 6010C	Inductively Coupled Plasma-Atomic Emission Spectrometry or equivalent	Screening	Metals	ICP-AES	Region 2 Assigned Laboratory	No
EPA/SW-846 Method 7470A	Mercury in Liquid Waste	Screening	Metals	CVAA	Region 2 Assigned Laboratory	No
EPA/SW-846 Method 1311	Toxicity Characteristic Leaching Procedure	NA	TCLP Extraction	NA	Region 2 Assigned Laboratory	No

ICP-AES = inductively coupled plasma – atomic emission spectroscopy

CVAA = cold vapor atomic absorption

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference¹
GC/MS	See SOM01.2	Initial calibration: upon award of the contract, whenever the laboratory takes corrective action which may change or affect the initial calibration criteria (e.g., ion source cleaning or repair, column replacement, etc.), or if the continuing calibration acceptance criteria have not been met. Continuing calibration: Once every 12 hours	Initial calibration/ Continuing calibration: relative response factor (RRF) greater than or equal to minimum acceptable response factor listed in Table 5 of procedure; %RSD must be less than or equal to value listed in Table 5 of procedure.	Initial calibration: inspect system for problems (e.g., clean ion source, change the column, service the purge and trap device), correct problem, re-calibrate. Continuing calibration: inspect system, recalibrate the instrument, reanalyze samples.	EPA CLP RAS Laboratory GC/MS Technician	SOM01.2
GC/MS	Refer to EPA SW-846 Method 8260C	Initial calibration: upon award of the contract, whenever major instrument maintenance or modification is performed or if the calibration verification technical acceptance criteria have not been met. Calibration verification: Once every 12 hours	Initial calibration/ Continuing calibration: relative response factor (RRF) greater than or equal to minimum acceptable response factor listed in procedure; %RSD must be less than or equal to value listed in procedure	Initial calibration: inspect system for problems (e.g., clean ion source, change the column, service the purge and trap device), correct problem, re-calibrate. Continuing calibration: inspect system, recalibrate the instrument, reanalyze samples.	Laboratory GC/MS Analyst	EPA SW-846 Method 8260C

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference¹
GC/MS	Refer to EPA SW-846 Method 8270D	Initial calibration: upon award of the contract, whenever major instrument maintenance or modification is performed or if the calibration verification technical acceptance criteria have not been met. Calibration verification: Once every 12 hours	Initial calibration/ Continuing calibration: relative response factor (RRF) greater than or equal to minimum acceptable response factor listed in procedure; %RSD must be less than or equal to value listed in procedure	Initial calibration: inspect system for problems (e.g., clean ion source, change the column, service the purge and trap device), correct problem, re-calibrate. Continuing calibration: inspect system, recalibrate the instrument, reanalyze samples.	Laboratory GC/MS Analyst	EPA SW-846 Method 8270D
GC/ECD	Refer to EPA SW-846 Method 8081B	Initial calibration: upon award of the contract, whenever major instrument maintenance or modification is performed or if the calibration verification technical acceptance criteria have not been met. Calibration verification: Once every 12 hours	Initial calibration/Calibration verification: resolution between two adjacent peaks must be greater than or equal to 60.0 percent, single components must be greater than or equal to 90.0 percent resolved, RTs within the RT window, %D must be within -20 percent, %RSD must be less than or equal to 20.0 percent.	Initial calibration: inspect the system (e.g., change the column, bake out the detector, clean the injection port) , correct problem, re-calibrate. Calibration verification: inspect system, recalibrate the instrument, reanalyze samples.	Laboratory GC/ECD Analyst	EPA SW-846 Method 8081B

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference ¹
GC/ECD	Refer to EPA SW-846 Method 8151A	Initial calibration: upon award of the contract, whenever major instrument maintenance or modification is performed or if the calibration verification technical acceptance criteria have not been met. Calibration verification: Once every 12 hours	Initial calibration/Calibration verification: RTs within the RT window, %D must be within -15 percent, %RSD must be less than or equal to 20.0 percent.	Initial calibration: inspect the system (e.g., change the column, bake out the detector, clean the injection port) , correct problem, re-calibrate. Calibration verification: inspect system, recalibrate the instrument, reanalyze samples.	Laboratory GC/ECD Analyst	EPA SW-846 Method 8151A
ICP-AES	Refer to EPA SW-846 Method 6010C	ICP-AES Initial calibration: daily or once every 24 hours and each time the instrument is set up. ICP-AES Continuing calibration: beginning and end of run and frequency of 10% or every 2 hours during an analysis run.	ICP-AES: As per instrument manufacturer's recommended procedures, with at least 2 standards.	ICP-AES: inspect the system, correct problem, re-calibrate, and reanalyze samples.	Laboratory ICP-AES Analyst	EPA SW-846 Method 6010C
CVAA (Mercury)	Initial 5-point, ICV/CCV after every 10 samples	Each day of use	$r > 0.995$ (initial), ICV = $\pm 10\%$, CCV = $\pm 10\%$	Perform maintenance, rerun calibration	Hg Analyst	SW-846 Method 7470A

¹Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23)

QAPP Worksheet #25

Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference¹
GC/MS	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	Acceptable re-calibration; see SOM01.2 or EPA Method 8260C or EPA Method 8270D	Inspect the system, correct problem, re-calibrate and/or reanalyze samples.	EPA CLP RAS Laboratory GC/MS Technician/ Laboratory GC/MS Analyst	SOM01.2 SW-846 Method 8260C SW-846 Method 8270D
GC/ECD	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	Acceptable re-calibration; see SOM01.2 or EPA Method 8081B or EPA Method 8151A	Inspect the system, correct problem, re-calibrate and/or reanalyze samples.	EPA CLP RAS Laboratory GC/ECD Technician/ Laboratory GC/ECD Analyst	SOM01.2 SW-846 Method 8081B SW-846 Method 8151A
ICP-AES, CVAA	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	As per instrument manufacturer's recommendations	Acceptable re-calibration; see ILM05.4 or EPA Method 6010C	Inspect the system, correct problem, re-calibrate and/or reanalyze samples.	EPA CLP RAS Laboratory ICP-AES / ICP-MS Technician	ILM05.4 EPA Method 6010C EPA Method 7470A

¹Specify the appropriate reference letter or number from Analytical SOP References table (Worksheet #23)

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QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization: SERAS personnel
Sample Packaging (Personnel/Organization: SERAS personnel
Coordination of Shipment (Personnel/Organization): SERAS personnel
Type of Shipment/Carrier: Overnight delivery service or courier
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian at designated laboratory
Sample Custody and Storage (Personnel/Organization): Sample Custodian at designated laboratory
Sample Preparation (Personnel/Organization): CLP sample technicians
Sample Determinative Analysis (Personnel/Organization): CLP chemists
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped on day of collection and arrive at laboratory within 24 hours (1 day) of collection
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical method
Biological Sample Storage (No. of days from sample collection): Not applicable
SAMPLE DISPOSAL
Personnel/Organization: CLP sample technicians
Number of Days from Analysis: Per CLP guidelines

QAPP Worksheet #27 **Sample Custody Requirements**

<p>Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Chain of custody records will be generated for all samples submitted for analysis per SERAS SOP #4005, <i>Chain of Custody Procedures</i>. Each sample will be individually labelled, then sealed with custody seals. Sample containers will be placed into Ziploc™ storage bags and then into a shipping cooler with the corresponding COC record. Samples will be shipped to the appropriate laboratory via overnight delivery service or courier. Refer to US EPA Office of Solid Waste and Emergency Response (OSWER) 924.0-44, EPA 540-R07-06 <i>Contract Laboratory Program Guidance for Field Samplers</i>, July 2007.</p> <p>EPA/ERT Scribe software will be used for sample management, as well as, generation of sample documentation, such as, labels and COC records. All COC records will be peer reviewed prior to shipment of samples in accordance with SERAS SOP # 4005, <i>Chain of Custody Procedures</i>. Samples will be shipped within 48 hours of sampling for next-day delivery under COC to the appropriate laboratory in accordance with SERAS SOP #2004, <i>Sample Packaging and Shipment</i>. Procedures outlined in SOP #2002, #2003, and #2004 will be applied (refer to Worksheet #21).</p>
<p>Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal): A sample custodian at the laboratory will accept custody of the shipped samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the laboratory manager for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. At this time, no samples will be archived at the laboratory.</p>
<p>Sample Identification Procedures: Sample identifications will conform to SERAS SOP #2002, <i>Sample Documentation</i>. Each soil, groundwater, and waste characterization sample will be identified with a unique CLP identification number provided by the EPA Region 2 Regional Sample Center Control (RSCC) for analysis. The appropriate CLP sample number will be listed on the label of every sample container collected at a given location. The sample numbers will be entered in the site EPA/ERT Scribe database.</p>
<p>Chain-of-custody Procedures: Refer to SERAS SOP #4005, <i>Chain of Custody Procedures</i></p>

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QAPP Worksheet #28-1 QC Samples Table

Matrix	Soil
Analytical Group	Target Compound List Volatile Organics
Concentration Level	Low/Medium (mg/kg)
Sampling SOP(s)	SERAS SOP #2012
Analytical Method/SOP Reference	SOM01.2
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	EPA CLP RAS Laboratory
No. of Sample Locations	TBD

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Method Blank	1 every 12 hours	No analyte > CRQL*		Suspend analysis unit source recertified	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	No analyte > CRQL*	
Matrix Spike (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	59-172 %R	Flag outliers	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,1-Dichloroethene	59-172 %R
		Trichloroethene	62-137 %R				Trichloroethene	62-137 %R
		Benzene	66-142 %R				Benzene	66-142 %R
		Toluene	59-139 %R				Toluene	59-139 %R
		Chlorobenzene	60-133 %R				Chlorobenzene	60-133 %R
Matrix Spike Duplicate (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	0-22 %RPD	Flag outliers	EPA CLP RAS Laboratory GC/MS Technician	Precision	1,1-Dichloroethene	0-22 %RPD
		Trichloroethene	0-24 %RPD				Trichloroethene	0-24 %RPD
		Benzene	0-21 %RPD				Benzene	0-21 %RPD
		Toluene	0-21 %RPD				Toluene	0-21 %RPD
		Chlorobenzene	0-21 %RPD				Chlorobenzene	0-21 %RPD

*with the exception of methylene chloride, 2-butanone & acetone which can be up to 2 times the CRQL. (USEPA CLP Nat'l Functional Guidelines, Final, July 2007)

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QAPP Worksheet #28-1 QC Samples Table

Matrix		Soil							
Analytical Group		Target Compound List Volatile Organics - Continued							
Concentration Level		Low/Medium (mg/kg)							
Sampling SOP(s)		SERAS SOP #2012							
Analytical Method/SOP Reference		SOM01.2							
Sampler’s Name		Jean Bolduc or Chris French							
Field Sampling Organization		SERAS							
Analytical Organization		EPA CLP RAS Laboratory							
No. of Sample Locations		TBD							
Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria		
Deuterated Monitoring Compounds	all samples	Vinyl chloride-d3	68-122 %R	Check calculations and instruments, reanalyze affected samples up to 3 DMCs per sample may fail to meet necessary limits (Section 11.3.4, Page D45/SOM01.2)	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	Vinyl chloride-d3	68-122 %R	
		Chloroethane-d5	61-130 %R				Chloroethane-d5	61-130 %R	
Deuterated Monitoring Compounds [cont’d]	all samples	1,1-Dichloroethene-d2	45-132 %R	Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet necessary limits (Section 11.3.4, Page D45 of SOM01.2)	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,1-Dichloroethene-d2	45-132 %R	
		2-Butanone-d5	20-182 %R				2-Butanone-d5	20-182 %R	
		Chloroform-d	72-123 %R				Chloroform-d	72-123 %R	
		1,2-Dichloroethane-d4	79-122 %R				1,2-Dichloroethane-d4	79-122 %R	
		Benzene-d6	80-121 %R				Benzene-d6	80-121 %R	
		1,2-Dichloropropane-d6	74-124 %R				1,2-Dichloropropane-d6	74-124 %R	
		Toluene-d8	78-121 %R				Toluene-d8	78-121 %R	
		trans-1,3-Dichloropropene-d4	72-130 %R				trans-1,3-Dichloropropene-d4	72-130 %R	
		2-Hexanone-d5	17-184 %R				2-Hexanone-d5	17-184 %R	
		1,4-Dioxane-d8	50-150 %R				1,4-Dioxane-d8	50-150 %R	
		1,1,2,2-Tetrachloroethane-d2	56-161 %R				1,1,2,2-Tetrachloroethane-d2	56-161 %R	

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QAPP Worksheet #28-1 QC Samples Table

Matrix		Soil						
Analytical Group		Target Compound List Volatile Organics - Continued						
Concentration Level		Low/Medium (mg/kg)						
Sampling SOP(s)		SERAS SOP #2012						
Analytical Method/SOP Reference		SOM01.2						
Sampler's Name		Jean Bolduc or Chris French						
Field Sampling Organization		SERAS						
Analytical Organization		EPA CLP RAS Laboratory						
No. of Sample Locations		TBD						
Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Deuterated Monitoring Compounds [cont'd]	all samples	1,2-Dichlorobenzene-d4	70-131 %R	Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet necessary limits (Section 11.3.4, Page D45/VOC of SOM01.2)	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,2-Dichlorobenzene-d4	70-131 %R
Internal Standards	all samples	50-200% of area, \pm 30 sec retention time shift		Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet necessary limits (Section 11.3.4, Page D45/VOC of SOM01.2)	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	50-100% of area, \pm 30 sec retention time shift	
Equipment (Field Blank)	1 at the end of drilling	NS		Document in final deliverable with impact to samples	SERAS TL	Accuracy/Bias (Contamination)	<RL	

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QAPP Worksheet #28-2 QC Samples Table

Matrix		Aqueous (Groundwater)						
Analytical Group		TCL Volatiles						
Concentration Level		Trace/Low (ug/L)						
Sampling SOP(s)		2001						
Analytical Method/SOP Reference		SOM01.2						
Sampler's Name		Jean Bolduc or Chris French						
Field Sampling Organization		SERAS						
Analytical Organization		EPA CLP RAS Laboratory						
No. of Sample Locations		TBD						
Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Method Blank	1 every 12 hours	No analyte > CRQL*		Suspend analysis unit source recertified	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	No analyte > CRQL*	
Matrix Spike (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	61-145 %R	Flag outliers	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,1-Dichloroethene	61-145 %R
		Benzene	76-127 %R				Benzene	76-127 %R
		Trichloroethene	71-120 %R				Trichloroethene	71-120 %R
		Toluene	76-125 %R				Toluene	76-125 %R
		Chlorobenzene	75-130 %R				Chlorobenzene	75-130 %R
Matrix Spike Duplicate (Not Required)	1 per ≤ 20 samples; if requested	1,1-Dichloroethene	0-14 %RPD	Flag outliers	EPA CLP RAS Laboratory GC/MS Technician	Precision	1,1-Dichloroethene	0-14 %RPD
		Benzene	0-11 %RPD				Benzene	0-11 %RPD
		Trichloroethene	0-14 %RPD				Trichloroethene	0-14 %RPD
		Toluene	0-13 %RPD				Toluene	0-13 %RPD
		Chlorobenzene	0-13 %RPD				Chlorobenzene	0-13 %RPD
Deuterated Monitoring Compounds	all samples	Vinyl chloride-d3	65-131 %R	Check calculations and instruments, reanalyze affected samples	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	Vinyl chloride-d3	65-131 %R
		Chloroethane-d5	71-131 %R				Chloroethane-d5	71-131 %R

*with the exception of methylene chloride, 2-butanone and acetone which can be up to 2 times the CRQL, or in some situations may require these compounds be up to 4 times the CRQL.

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QAPP Worksheet #28-2 QC Samples Table

Matrix	Aqueous (Groundwater)
Analytical Group	TCL Volatiles Continued
Concentration Level	Trace/Low (ug/L)
Sampling SOP(s)	2001
Analytical Method/SOP Reference	SOM01.2
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	EPA CLP RAS Laboratory
No. of Sample Locations	TBD

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Deuterated Monitoring Compounds [cont'd]	all samples	1,1-Dichloroethene-d2	55-104 %R	Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet recovery limits	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,1-Dichloroethene-d2	55-104 %R
		2-Butanone-d5	49-155 %R				2-Butanone-d5	49-155 %R
		Chloroform-d	78-121 %R				Chloroform-d	78-121 %R
		1,2-Dichloroethane-d4	78-129 %R				1,2-Dichloroethane-d4	78-129 %R
		Benzene-d6	77-124 %R				Benzene-d6	77-124 %R
		1,2-Dichloropropane-d6	79-124 %R				1,2-Dichloropropane-d6	79-124 %R
		Toluene-d8	77-121 %R				Toluene-d8	77-121 %R
		trans-1,3-Dichloropropene-d4	73-121 %R				trans-1,3-Dichloropropene-d4	73-121 %R
		2-Hexanone-d5	28-135 %R				2-Hexanone-d5	28-135 %R
		1,4-Dioxane-d8	50-150 %R				1,4-Dioxane-d8	50-150 %R
		1,1,2,2-Tetrachloroethane-d2	73-125 %R				1,1,2,2-Tetrachloroethane-d2	73-125 %R

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QAPP Worksheet #28-2

QC Samples Table

Matrix	Aqueous (Groundwater)
Analytical Group	TCL Volatiles Continued
Concentration Level	Low (ug/L)
Sampling SOP(s)	2007
Analytical Method/SOP Reference	SOM01.2
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	EPA CLP RAS Laboratory
No. of Sample Locations	TBD

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits		Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria	
Deuterated Monitoring Compounds [cont'd]	all samples	1,2-Dichlorobenzene-d4	80-131 %R	Check calculations and instruments, reanalyze affected samples; up to 3 DMCs per sample may fail to meet recovery limits	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	1,2-Dichlorobenzene-d4	80-131 %R
Internal Standards	all samples	60-140%		Check calculations and instruments, reanalyze affected samples	EPA CLP RAS Laboratory GC/MS Technician	Accuracy	± 40 % of response area, ± 20 sec retention time shift	
Equipment (Field Blank)	1 at the end of drilling	NS		Document in final deliverable with impact to samples	SERAS TL	Accuracy/Bias (Contamination)	<RL	

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QAPP Worksheet #28-3 QC Samples Table

Matrix	Soil (Investigation-Derived Waste)
Analytical Group	TCLP Volatiles
Concentration Level	Low
Sampling SOP(s)	SERAS SOP 2009
Analytical Method/SOP Reference	EPA 1311/8260C
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	TBD
No. of Sample Locations	Up to 2

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	1 per 20 samples	Within laboratory control chart limits	Flag outliers	Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Laboratory Duplicate	1 per 20 samples	Within laboratory control chart limits	Flag outliers		Precision	Same as Method/SOP QC Acceptance Limits
LCS	1 per 20 samples	Within laboratory control chart limits	Flag outliers or reanalyze		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Internal Standards	all samples	50-100% of area, \pm 30 sec retention time shift	Reanalyze samples to confirm matrix effects		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

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QAPP Worksheet #28-3 QC Samples Table

Matrix	Soil (Investigation-Derived Waste)					
Analytical Group	TCLP Volatiles Continued					
Concentration Level	Low					
Sampling SOP(s)	SERAS SOP 2009					
Analytical Method/SOP Reference	EPA 1311/8260C					
Sampler's Name	Jean Bolduc or Chris French					
Field Sampling Organization	SERAS					
Analytical Organization	TBD					
No. of Sample Locations	Up to 2					

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spikes	All samples	Within control chart limits	Reanalyze samples to confirm matrix effects	Laboratory GC/MS Analyst	Accuracy/Bias	Within control chart limits
Method Blank	1 every 12-hours	<RL	Reanalyze, if still out, determine source of contamination and recalibrate and reanalyze	Analyst	Accuracy/Bias (Contamination)	<RL

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QAPP Worksheet #28-4
QC Samples Table

Matrix	Soil (Investigation-Derived Waste)
Analytical Group	TCLP Semi-Volatiles
Concentration Level	Low
Sampling SOP(s)	SERAS SOP 2009
Analytical Method/SOP Reference	EPA 1311/8270D
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	TBD
No. of Sample Locations	Up to 2

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	1 per 20 samples	Within control chart limits	Flag outliers	GC/MS Laboratory Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Laboratory Duplicate	1 per 20 samples	Within control chart limits	Flag outliers		Precision	Same as Method/SOP QC Acceptance Limits
LCS	1 per 20 samples	Within control chart limits	Flag outliers or reextract		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

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QAPP Worksheet #28-4
QC Samples Table

Matrix	Soil (Investigation-Derived Waste)
Analytical Group	TCLP Semi-Volatiles Continued
Concentration Level	Low
Sampling SOP(s)	SERAS SOP 2009
Analytical Method/SOP Reference	EPA 1311/8270D
Sampler's Name	Jean Bolduc
Field Sampling Organization	SERAS
Analytical Organization	TBD
No. of Sample Locations	Up to 2

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Standards	All samples	Within control chart limits	Check calculations and instruments, reanalyze affected samples	GC/MS Laboratory Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Internal Standards	all samples	50-100% of area, \pm 20 sec retention time shift	Check calculations and instruments, reanalyze affected samples		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Method Blank	1 every 12-hours	<RL	Reanalyze, if still out, determine source of contamination and recalibrate and reanalyze	Analyst	Accuracy/Bias (Contamination)	<RL

QAPP Worksheet #28-5
QC Samples Table

Matrix	Soil (Investigation-Derived Waste)
Analytical Group	TCLP Pesticides
Concentration Level	Low
Sampling SOP(s)	SERAS SOP 2009
Analytical Method/SOP Reference	EPA 1311/8081B
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	TBD
No. of Sample Locations	Up to 2

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 every 12 hours	< RL	Reanalyze, if still out, determine source of contamination and recalibrate and reanalyze	Laboratory GC/ECD Analyst	Accuracy/Bias	No analyte > RL
Matrix Spike	1 per 20 samples	Within control chart limits	Flag outliers		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Laboratory Duplicate	1 per 20 samples	Within control chart limits	Flag outliers		Precision	Same as Method/SOP QC Acceptance Limits
LCS	1 per 20 samples	Within control chart limits	Flag outliers; Reextract and reanalyze		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Surrogate Standards	all samples	Within control chart limits	Flag outliers		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

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QAPP Worksheet #28-6 QC Samples Table

Matrix	Soil (Investigation-Derived Waste)
Analytical Group	TCLP Herbicides
Concentration Level	Low
Sampling SOP(s)	SERAS SOP 2009
Analytical Method/SOP Reference	EPA 1311/8151A
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	TBD
No. of Sample Locations	Up to 2

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per 20 samples	No analyte > RL	Suspend analysis unit source recertified	Laboratory GC/ECD Analyst	Accuracy/Bias	No analyte > RL
Matrix Spike	1 per 20 samples	Within laboratory control chart limits	Flag outliers		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Matrix Spike Duplicate	1 per 20 samples	Within laboratory control chart limits	Flag outliers		Precision	Same as Method/SOP QC Acceptance Limits
Laboratory Control Sample	1 per 20 samples	Within laboratory control chart limits	Flag outliers; Reextract and reanalyze		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Surrogate	All samples	Within laboratory control chart limits	Flag outliers		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

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QAPP Worksheet #28-7
QC Samples Table

Matrix	Soil (Investigation-Derived Waste)
Analytical Group	TCLP Metals
Concentration Level	Low
Sampling SOP(s)	SERAS SOP 2009
Analytical Method/SOP Reference	EPA 1311/6010C/7470A
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	TBD
No. of Sample Locations	Up to 2

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per 20 samples	<RL	Reanalyze and flag data or re-digest and re-analyze affected samples	ICP-AES/ CVAA Laboratory Analyst	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
MS	1 per 20 samples	75-125%R	Flag outliers		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Laboratory Duplicate	1 per 20 samples	± 20% RPD	Flag outliers		Precision	Same as Method/SOP QC Acceptance Limits
Post-Digestion Spike	After any analyte except Ag or Hg fails spike %R	80-120%R	Flag outliers		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits
Interference Check Sample	Beginning, after, and periodically during run (2 times every 8 hours)	Within ±2 times CRQL of true value or ±20% of true value, whichever is greater	Check calculations and instruments, re-analyze affected samples		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

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QAPP Worksheet #28-7
QC Samples Table

Matrix	Soil (Investigation-Derived Waste)
Analytical Group	TCLP Metals
Concentration Level	Low
Sampling SOP(s)	SERAS SOP 2009
Analytical Method/SOP Reference	EPA 1311/6010C/7470A
Sampler's Name	Jean Bolduc or Chris French
Field Sampling Organization	SERAS
Analytical Organization	TBD
No. of Sample Locations	Up to 2

Lab QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Control Sample	1 per \leq 20 samples	80-120%R	Suspend analysis until source rectified; re-digest and re-analyze affected samples		Accuracy/Bias	Same as Method/SOP QC Acceptance Limits

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QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	On-Site Monitoring & Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
COC records Sample Labels Custody Seals Groundwater Sampling Field Sheets Scribe database Field Logbook – GPS, TVA and soil logging data Photodocumentation Field Change Form (if necessary)		Instrument run logs Sample extraction logs Sample digestion logs Preventative maintenance logs Instrument printouts Internal COC records Temperature logs Standard receipt logs Standard prep logs Data Reduction/Data Review records Analytical Results	Peer review records ESAT Data Validation Report	Amended Work Plan Revised QAPP Trip Report Scribe Database

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**QAPP Worksheet #30
Analytical Services Table**

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil	VOCs	Low/Medium	See Worksheet #18	SOM01.2	21 days	CLP assigned laboratory	NA
Aqueous (Groundwater)	VOCs	Trace/Low	See Worksheet #18	SOM01.2	21 days	CLP assigned laboratory	NA
Investigation Derived Waste Soil	TCLP VOCs	Low	See Worksheet #18	EPA SW-846 Method 1311/8260C	21 days	CLP assigned laboratory	NA
	TCLP SVOCs			EPA SW-846 Method 1311/8270D			
	TCLP Pesticides			EPA SW-846 Method 1311/8081			
	TCLP Herbicides			EPA SW-846 Method 1311/8151			
	TCLP Metals			EPA SW-846 Method 1311/6010C/7470A			

NA = Not applicable

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QAPP Worksheet #31
Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)
Laboratory Technical Systems/Performance Audits	NA	External	Regulatory Agency	Regulatory Agency	EPA CLP RAS Laboratory	EPA CLP RAS Laboratory	EPA or other Regulatory Agency
Performance Evaluation Samples	NA	External	Regulatory Agency	Regulatory Agency	EPA CLP RAS Laboratory	EPA CLP RAS Laboratory	EPA or other Regulatory Agency

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QAPP Worksheet #32
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Field Observations/ Deviations from Work Plan	Logbook	Jean Bolduc TL/SERAS	Immediately	Field Change Form	Jean Bolduc/TL - SERAS	Within 24 hours of change
Peer Review	In the deliverable	Jean Bolduc TL/SERAS	Prior to deliverable due date	Comments directly in the deliverable	Jean Bolduc/TL - SERAS	Prior to deliverable due date
Laboratory Technical Systems/Performance Audits	Audit Report	CLP	30 days	Letter	CLP	14 days
Performance Evaluation Samples	Electronic Report	CLP Laboratory	30 days	Letter or written report	CLP Laboratory	14 days

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QAPP Worksheet #33
QA Management Reports Table

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Technical Report	Monthly	20 th of the month following performance period	TL/SERAS	ERT Project Officer and WAM
QA Report	Quarterly	February, May, August, November	Deborah Killeen, QA/QC Officer/SERAS	ERT Project Officer and Quality Coordinator

QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Completeness Check	Review of planning documents, analytical data package, sampling documents and external reports, as applicable, using the UFP-QAPP checklist	Internal	SERAS TL
Laboratory analytical data package	Data packages will be reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	External	CLP Laboratory
	Reviewed for measurement performance criteria	External	ESAT Data Validation Team
Trip Report	Deliverable will be reviewed to verify transcription errors are not present	Internal	SERAS peer review team

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QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in the QAPP were followed and any deviations noted	SERAS TL, WAM
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to PQOs.	ESAT Data Validation Personnel, EPA Region 2, ERT WAM
IIa	Chains of custody	Examine COC forms against QAPP and laboratory contract requirements (e.g., analytical methods, sample identification, etc.).	CLP Analysts, ESAT Data Validation Personnel, EPA Region 2 SERAS TL
IIa	Laboratory data package	Examine packages against QAPP and laboratory contract requirements, and against COC forms (e.g., holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	CLP Analysts, ESAT Data Validation Personnel, EPA Region 2
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to PQOs. Examples include PQLs and QC sample limits (precision/accuracy).	ESAT Data Validation Personnel, EPA Region 2
IIb	Field duplicates	Compare results of field duplicate (or replicate) analyses with RPD criteria	SERAS TL ERT WAM

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QAPP Worksheet #36
Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa/IIb	Soil/Groundwater	VOCs	Low/Medium	SOP #HW-33, <i>Low/Medium Volatile Data Validation</i> , Revision 3	ESAT Data Validation Personnel, EPA Region 2 Data Validation Personnel

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☒ Worksheet Not Applicable (State Reason) EPA Region 2 will be responsible for assessing the usability of the data.

QAPP Worksheet #37
Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:
Describe the evaluative procedures used to assess overall measurement error associated with the project:
Identify the personnel responsible for performing the usability assessment: Region 2
Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies: